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THE CAMEROONS DISTRICT OF WEST AFRICA.

AT a meeting of the Geographical Society of Berlin, July 6, 1889, Capt. Kund gave a brief *résumé* of the results of the two expeditions led by him into the country lying inland from the Batanga coast, in the Cameroons district of West Africa, which is reported in the "Proceedings of the Royal Geographical Society." The opposition which the coast population offered to the entry of the expedition was only passive, but nevertheless very irritating. All kinds of stratagems, lies, deceits, and false directions as to routes—of course to no purpose—were tried by them. It was owing to the calumnious reports spread by the inhabitants of the coast, that the expedition, as it penetrated farther into the interior, encountered hostility from the natives, who, made uneasy by the reports conveyed to them by traders from the coast, became fearful, as the white men approached, for their wives and stores of ivory.

The violent attack made upon the expedition by the Bekok, on the first return to the coast in the spring of 1888, rendered it absolutely necessary, in order that the prestige of the white man in these regions should be maintained, for the party to return again as soon as possible to that part of the country; for the news had spread far and wide that the natives had succeeded in killing the white men, and in destroying the expedition. The re-appearance of the supposed dead men was consequently a great moral success, and the second advance presented hardly any difficulties. Among many tribes the expedition was even received with songs and dances, and everywhere the suspicion that the expedition had come for the purpose of taking vengeance quickly disappeared. Capt. Kund, on this occasion, announced most emphatically that nothing was further from his intentions than to take any unfair advantage of the natives, that he had left no stone unturned in order to convince them of his peaceable intentions, and that the first shot had never been fired from his side. It was continually the want of interpreters which caused the complications in which on different occasions he became involved with the natives.

Although the second journey resulted in little that is new from a geographical point of view, inasmuch as the route followed differed in unimportant points from that taken on the first occasion, still the detailed knowledge of the country was considerably increased, and a much more complete insight into the ethnographical conditions of the region was obtained. Thus the expedition became acquainted with a race of people, which, on the first journey, had remained quite unknown. The inhabitants of the primeval-forest region are of remarkably small stature, although not dwarfs, and are yellow-skinned. They roam through the forests without having any fixed abodes, and live by the chase. These people appear to represent the aborigines of the country, who were the first to make paths in the virgin forest. They call themselves the Bojaëli, but are named Baiëa by the other tribes. They kill elephants with spears, and possess extraordinary skill in finding their way through the dense forest.

The ethnographical features of the southern Cameroons territory, between the Sannaga and the Campo, are, according to the present state of our knowledge, as follows. Between the Sannaga and the Njong dwell the important group of the Mvelle (Bakoko), who are very unequally distributed through the region of primeval forest as far as the coast range of mountains. The coast itself is here uninhabited. South of the Njong, the Banoko and Bapuko (the so-called Batanga people) live on the coast. They have probably come here from the north. In the rear of them dwell the Kasjua, called by the Batanga people Mabea. They belong to another race, and have probably immigrated from the south. The inhabited part of the coast is, with the exception of the banks of the Njong and Lokundje, where narrow belts of population—on the former the Bakoko, and on the latter the Kasjua and Bakoko intermingled—extend into the interior, nowhere broader than about nine miles. Then follows the uninhabited region of primeval forest, about one hundred and twenty miles broad, in which only the Bojaëli live. In the valleys of the first steep mountain-range the Ngumba live. They call themselves Mavumba, and are closely related to the Kasjua, having probably in the same way immigrated hither from the south. In the north they border at the Lokendje River, on the Batoko; in the south, on the Bulei. The latter belong to the Fang

group, and have pushed their way along the right bank of the Ntembe (Campo River) almost as far as the coast. They embitter the lives of the Ngumba people by constant attacks. East of the Ngumba territory, the country for a stretch of about forty-five miles is again uninhabited, and it is there that the second steep ascent to the great plateau of the interior of Africa commences. The plateau itself is extraordinarily densely populated, and by people closely related in their language to the Fang (Mpangwe, the Fans of Du Chaillu) on the Ogowe. Some porters belonging to the latter race accompanied the expedition, and they very quickly learned to make themselves understood by the people of the plateau. The sequence of tribes from the left bank of the Sannaga is as follows: the Jetoni, Botinga, Kolle, Jetudi, Jeundo, Bane, Tinga, Baba, Janguana, and Bulei in the south. The Jeundo and Tinga are distinguished in the most favorable manner from the peoples living farther west. They are of remarkably tall and slim stature, are well nourished, and thoroughly healthy. Their features are, in the case of both sexes, extraordinarily regular. They have a marked tendency to harmless gayety and dancing. The men wear round the loins a piece of bark cloth. It is peculiar that the women for covering their back parts use large bunches of grass threads colored red-brown, while their front parts are barely concealed by a banana-leaf. In the midst of this interesting people, at a point situated about $3^{\circ} 48'$ north latitude and about 12° east longitude, and close on the boundary line between the Bantu and Sudan negroes, the expedition erected their station, at which Lieut. Tappenbeck is at the present time stopping alone.

SPRAYING WITH THE ARSENITES.¹

NINE years ago, at the first meeting of this society, I presented a paper upon the use of Paris-green as a specific against the codling-moth. In that paper I gave the results of careful and elaborate experiments, which settled two facts which were very important in economic entomology,—first, that Paris-green was efficient as a preventive of the ravages of the codling-larva; and, second, that such use was entirely safe in respect to poisoning the fruit. To-day, less than a decade from the date of the discovery of this remedy, this method to combat the worst insect-pest of the apple-grower, is generally adopted by the more intelligent orchardists of our country. Its value is now universally conceded. Easy and cheap methods to apply the insecticide are now known and generally adopted.

For several years myself and others have been experimenting, in hopes to find that this same insecticide was equally efficient to destroy the plum curculio. For six or seven years I have sprayed plum-trees once, and even twice, with no apparent good. Test-trees close beside the trees sprayed, and that were not treated, were as free from attack as were the trees that were sprayed, and the trees treated were no more exempt from attack than the others. Thus I was convinced that this insecticide was of no value in this curculio warfare. Several of my horticultural friends, in whose ability to experiment and observe correctly I had great confidence, had tried this remedy with very satisfactory results. In 1888 I studied this matter very closely, and concluded that as the plum is a smooth fruit, with no calyx-cup, like that of the apple, in which the poison may lodge, and as the curculio lays its egg anywhere on the smooth rind, the poison would be very easily washed off, or even blown off by the wind. I thus concluded that my want of success was very likely due to a want of thoroughness. In 1888 I sprayed certain trees three times at intervals of eight days, and omitted to treat other trees close alongside. The benefit from spraying was very marked.

I also found that carbolized plaster (one pint of crude carbolic acid to fifty pounds of plaster) was quite as efficient to repel the curculio as was the arsenites. This was also applied three times. The season was very dry, and there were few or no rains to wash off the insecticides. This year I repeated the experiments both with the London-purple and with the carbolized plaster, but with no success. All the trees were severely attacked, and all the plums lost. This year we had almost daily rains, which were frequently quite severe.

¹ Abstract of a paper by A. J. Cook, read at Toronto, Aug. 26, before the Society for the Promotion of Agricultural Science.

I believe I am warranted in the following conclusions: the arsenites and carbolized plaster will protect against the plum curculio if they can be kept on the tree or fruit; but, in case of very frequent rains, the jarring method will not only be cheaper, but much more effective. Again: as our wild fruits are more cleared away, we must have plums in our orchards to protect the apples from the curculio. When apples are seriously stung, they become so gnarled and deformed as to be worthless. It will pay, then, to set plum-trees near by or among the apple-trees. Then we will escape mischief among our apples from the curculio, and will only need to spray our apples once to destroy the codling-moth, and can treat the plum-trees three or four times with Paris-green or carbolated lime, in case we have only occasional showers, or can jar the trees when the rains are very frequent. For the apples we can use London-purple (one pound to two hundred gallons of water); for the plums we must use Paris-green (one pound to two or three hundred gallons of water). If the carbolated plaster is preferred, we use one pint of crude carbolic acid to fifty pounds of land-plaster. This is thrown freely over the trees, so as to strike every plum on the tree which is being treated.

Another very important practical point has been suggested by the past season's experience with these insecticides. I refer to the danger of applying them before the blossoms fall. Bees are quite as susceptible to these poisons as are the codling-larvæ and curculio. In their good work of collecting nectar and fertilizing the blossoms, they are very certain to take the poison as well, if the trees have been sprayed. Of course, there is no excuse for spraying at so early a date, as neither the curculio nor codling-larvæ commence their attack till the blossoms fall. Thus for the object in mind, as well as for the safety of the bees, delay should be insisted upon. I think we as scientists, and all educated men, should pronounce vehemently and with one voice against spraying our fruit-trees with the arsenites till the blossoms have all fallen. We should even go further: we should secure the enactment of laws which would visit any such offence with fine and imprisonment. Such laws would prove a ready and active educator.

In the past season many bee-keepers have lost severely from the neglect of their fruit-growing neighbors to observe this caution. I will only mention two cases. Mr. John G. Smith, Barry, Ill., writes, "One of my neighbors, owning an orchard of about one hundred acres of apple-trees, sprayed the trees with Paris-green and water just as they were in full bloom. The result is that ten or twelve bee-keepers are ruined." The imago no less than the larvae and pupæ were destroyed. Mr. J. A. Pearce, Grand Rapids, Mich., was also a heavy loser from the same cause. His bees likewise died in all stages of development.

It is well to remember and to urge that this loss is not confined to the bee-keeper, for the fruit-grower as well as the apiarist needs the bees and their work to insure his best success. It only requires, then, that our people know the truth, to insure against loss in this direction.

Another practical question of no small moment in this use of the arsenites refers to injury to the foliage of the trees treated. In an elaborate series of experiments the past season, we desired to learn the effect on different trees of the different arsenites, and whether the date of treatment and atmospheric condition had any influence. From these experiments I think we are warranted in the following conclusions:—

First, London-purple is more injurious to the foliage than is Paris-green, and white arsenic (arsenious acid) is more harmful than is either London-purple or Paris-green. This is doubtless owing to the soluble arsenic, which is quite abundant in London-purple, and almost absent in Paris-green. In one experiment it was seen that the colored water after London-purple fully settles is very destructive to foliage, while aniline is not at all harmful. This agrees with the experiments of Professor C. P. Gillette, made in 1888, where white arsenic was found very destructive to foliage.

Second, Peach foliage is especially susceptible to injury, and cherry foliage the least so of any of the kinds treated.

Third, It would seem that London-purple and white arsenic, used just before a rain, are more harmful than when used during a drought. We not only saw greater injury when a rain followed spraying within two or three days, but secured the same results by

spraying, soon after treatment, with pure water. This also accords with the view that the injury comes from the presence of soluble arsenic.

Fourth, It would seem that spraying soon after the foliage puts out is less harmful than when it is delayed a few days, or, better, a few weeks. For ten years I have sprayed both apple and plum trees in May, and for several years with London-purple, and often used a mixture as strong as one pound to one hundred, or even fifty, gallons of water; yet in most cases no damage was done. This year I sprayed several trees in May, using one pound to one hundred gallons of water, with no damage. In June and July, spraying the same trees with a mixture only one-half as strong did no slight injury. This fact, if fact it be, accounts for the few reports of injury in the past, even with a stronger mixture, and the frequent reports of damage within a year or two, even with a dilute mixture. Then the spraying was confined to May: now it reaches to June, or even to July.

Fifth, London-purple may be used on apple, plum, cherry, pear, and most ornamental trees, but on these should never be stronger than one pound to two hundred gallons of water. If the application is to be repeated, as it must be for the curculio, to prove effective, or if it is to be used in June or July, Paris-green should be used in the same proportion as above, or else we should only use one pound of London-purple to three hundred gallons of water. I now think that this necessity is more due to time of application than to the fact of increased quantity of the poison.

Sixth, If the arsenites are to be used on the peach to defend against the curculio, Paris-green only should be used, and that not stronger than one pound to three hundred gallons of water. With the peach the poison is not only absorbed, coloring the tissue purple or brown, but even the petiole or stem of the leaf is weakened, and the leaf falls. Thus in several cases where we used London-purple (one pound to two hundred gallons of water) or white arsenic, the peach-leaves all fell off. White arsenic colors the tissue the same as does the London-purple, showing once more that it is the soluble arsenic, not aniline, that does the mischief.

Seventh, The injury done to the foliage is never immediately apparent. It usually shows somewhat the second day; but the full injury is frequently not manifest till the fifth day, and often not till the tenth.

Another important practical question which I have tried to settle this season (1889) concerns the danger of pasturing under trees which have been sprayed with the arsenites.

A gentleman wishing to spray his orchard, in which he was pasturing seventy-five hogs, consulted me as to the wisdom of doing so without first removing the swine. I told him I believed there was no danger. I said, "Use a mixture of one pound of London-purple to two hundred gallons of water, watch your hogs closely, and, if any seem affected, remove all at once, and I will be responsible for damages to the amount of twenty-five dollars." The gentleman did so, and reports no damage.

In the following experiments I used the mixture of twice the strength which should be used, that the experiment might be the more convincing. I used one pound to one hundred gallons of water. In every case the spraying was very thoroughly done. Care was taken that every twig and leaf should be drenched.

In tree No. 1 a thick paper was placed under one-half of a rather small apple-tree. The space covered was six by twelve feet, or seventy-two square feet. The paper was left till all dripping ceased. As the day was quite windy, the dripping was rather excessive. In this case every particle of the poison that fell from the tree was caught on the paper. Dr. R. C. Kedzie analyzed the poison, and found four-tenths of a grain. Tree No. 2 was a large tree, with very thick foliage. Underneath this tree was a thick carpet of clover, blue-grass, and timothy just in bloom. The space covered by the tree was fully sixteen feet square, or equal to two hundred and fifty-six square feet. As soon as all dripping had ceased, the grass under the tree was all cut very gently and very close to the ground. This was taken to the chemical laboratory and analyzed by Dr. R. C. Kedzie. There were found two and two-tenths grains of arsenic. Now, as our authorities say that one grain is a poisonous dose for a dog, two for a man, ten for a cow, and twenty for a horse, there would seem to be small danger from pasturing our

orchards during and immediately after spraying, especially as no animal would eat the sprayed grass exclusively. To test this fully, I sprayed a large tree over some bright tender grass and clover. I then cut the clover carefully, close to the ground, and fed it all to my horse. It was all eaten up in an hour or two, and the horse showed no signs of any injury. This mixture, remember, was of double the proper strength, was applied very thoroughly, and all the grass fed to and eaten by the horse. This experiment was repeated, with the same result. I next secured three sheep. These were kept till hungry, then put into a pen about a tree under which was rich, juicy June-grass and clover. The sheep soon ate the grass, yet showed no signs of any injury. This experiment was repeated twice, with the same result. It seems to me that these experiments are crucial, and settle the matter fully. The analyses show that there is no danger: the experiments confirm the conclusion.

Thus we have it demonstrated that the arsenites are effective against the codling-moth; that in their use there is no danger of poisoning the fruit, and, when used properly, no danger to the foliage, nor to stock that may be pastured in the orchard.

PLANT-LIFE OF ARABIA FELIX.

PROFESSOR SCHWEINFURTH, at a recent meeting of the Berlin Geographical Society, spoke of his journey to Arabia Felix, undertaken from November, 1888, to March, 1889, with the object of making botanico-geographical studies. Stimulated by a journey of the French botanist, A. Deflers, in the year 1888, Schweinfurth determined to make one of the chief objects of this journey to Yemen the obtaining of authentic specimens of a large number of the species of plants described by the Swede, Peter Forskal, the botanist of the Niebuhr expedition (1761), who, when barely twenty-seven years old, fell a victim to the climate after much ardent activity in exploration. For what reason the scientific world, considering the complete opening-up of this ancient land of civilization, has deferred so long the exploration of the country, it is difficult to understand; since Yemen, not only since the recent taking-possession of the country by the Turks, but for a long period, has been distinguished, above all other parts of South Arabia, for the safety of travel and the well-tested courtesy of the inhabitants towards Europeans. Several plants, useful to man and cultivated by him, have, through the medium of South Arabia, found their way to the civilized countries of the north. Some, like coffee, appear to have been converted here for the first time from their natural state into the service of man. In ancient times there were in the first place various fragrant substances exported from here. On that account the country was named, from the oldest dynasties of the Pharaohs down to the later Roman period, the holy land, the land of the gods. The Punt country of the old Egyptians is surely not only to be looked for in Africa, but denotes in the wider sense the territory on both shores of the southern part of the Red Sea. The designations "stair" mountain and "step" mountain, both in the old hieroglyphics as well as in Ptolemy and in the works of Arabian geographers, Yakut and Hamdany, refer especially to the terraced cultivated slopes of South Arabia, constructed with such a large expenditure of labor, while they possess no meaning if applied to the Somali country. The ancient Egyptians took special care of certain trees, which were dedicated to particular deities. Thus the sycamore-tree was consecrated to Hathor. From the oldest tombs found in the Pyramids, and belonging to the fourth dynasty, down to the latest lists of offerings of the Ptolemaic-Roman epoch, the fruit of the *persea* (*Mimusops schimperi*), the "aschd," appears as a continually recurring gift to the gods and to the departed. The tree was regarded as specially sacred, and was dedicated to the greatest god, Râ, the sun, and on numerous occasions the leaves and fruit of both trees have been brought from the tombs to the light of day. The foreign origin of the tree called *Persea* in the Grecian authors, not to be confounded with the *Persea gratissima* of to-day, as coming from Ethiopia, by which term Abyssinia as well as South Arabia may be understood, is attested by Strabo and Diodorus, and confirmed by the present widespread existence of wild-growing species. For several centuries the tree has entirely disappeared from Egypt. On the other hand, the sycamore, al-

though only in a cultivated state, is still to be found in Egypt and certain parts of Syria. Schweinfurth has now discovered in Yemen in numerous places fig-trees, in the case of which he has proved botanically that these trees, called in the mountainous country *chanes*, and in the lowlands *burra*, are completely identical with the Egyptian sycamore. At the same time the traveller found, in the lowest mountain regions of Yemen, the *Persea* of the ancients growing wild; and it was there designated with the old Arabic name *lebbach*, which was known to the Arabian geographers of the middle ages. The *Mimusops schimperi* was formerly only found in North Abyssinia. With the disappearance of the tree in Egypt, for the protection of which the Emperor Arcadius made a special law, which is still preserved, there disappeared in later Egypt also the proper meaning of the name *lebbach*; and at the commencement of the last century the term was transferred to a species of acacia (*Albizia zebbell*) introduced from India, which is to-day the most widely spread tree in Egypt. In connection with the traditions inscribed on the ancient monuments, the fact that in Yemen to-day there are still species of trees growing wild, which several thousands of years ago and during a period of three thousand years were held in Egypt to be sacred as symbols of divine worship, throws important light upon the old relations subsisting between the two countries.

HEALTH MATTERS.

THE INHALATION OF DUST.—Dr. Kunze, in his inaugural thesis for the M.D. degree of the University of Kiel, publishes as a contribution to the diseases caused by the inhalation of dust a series of examinations of lungs so affected. In all these, as stated in a recent number of the London *Lancet*, dust was found microscopically; and, after chemical tests in the various anatomical and histological parts of the lungs and in the interior of the lymphatic vessels, numerous leucocytes were found covered with the dust. Being arrested in its progress, it causes inflammation, producing hyperplasia of connective tissue, especially where a dense network of lymphatic vessels exists. Dr. Kunze also proved that the degree of alteration in so-called "dust lungs" depends not merely on the quantity of the dust inhaled, but also on its greater or less morphological power of injuring the tissue. He concludes from his experiments that even the greatest alterations in these lungs—such as nodes, indurations, and vomicæ—are mainly produced by the inhaled dust, and that tuberculosis is only an occasional coincidence. The least serious alterations in the lungs resulted from the inhalation of lamp-black, the particles of which are very fine and little injurious; the most serious, from the dust inhaled by earthenware manufacturers and stone-masons. The lungs of a locksmith showed only a moderate hyperplasia of connective tissue, the dust consisting partly of the finest particles of iron. In a worker in oxides of iron the lungs were found full of small granules, and the morbid changes in the tissues were very considerable. The lungs of gold-miners were generally indurated and atrophied: the dust in these cases is exceedingly fine. Sand produced numerous circumscribed hard nodules and thick indurations. In cloth-manufacturers, the lungs, in spite of their contact with an enormous quantity of organic dust, presented but few indurations. In the lungs of two stone-masons, induration and tuberculous disintegration were observed: all the other lungs were entirely free from tubercles of any kind,—an observation which was verified by the absence of tubercle bacilli in the muco-pus in the vomicæ.

CONGRESS FOR TUBERCULOSIS.—The second congress for tuberculosis will be held in Paris during the latter part of July, 1890. Professor Villemin will act as president. The following questions are to be discussed: 1. The identity of human and bovine tuberculosis, also that of other animals; 2. The bacteriological and morbid associations of tuberculosis; 3. The isolation of tuberculous subjects; 4. The agents capable of destroying Koch's tubercle bacillus, with a view to the prophylaxis and therapeutics of the disease in man.

MEDICINE IN JAPAN.—In Japan there are thirty-one schools of medicine, one of dentistry, and two of veterinary surgery. The University of Tokio (the Imperial University) has over twelve hun-